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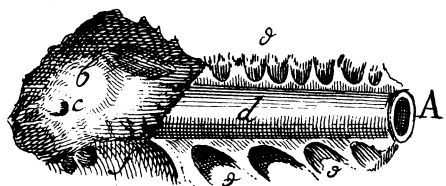


Fig. 11.

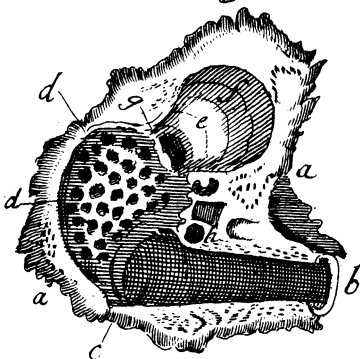


Fig. III

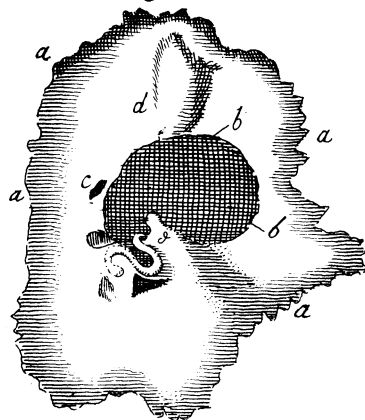


Fig. III



V



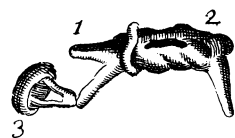
VI



VII.



VIII.



IX.

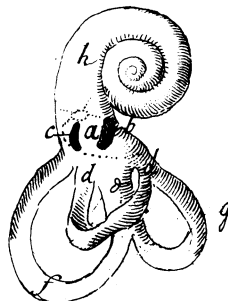
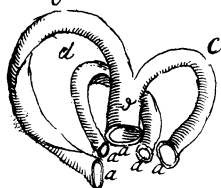
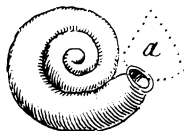
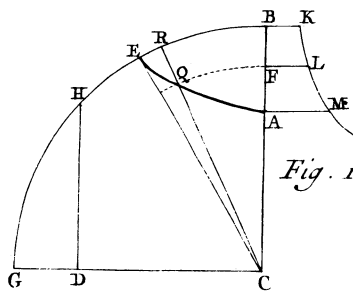


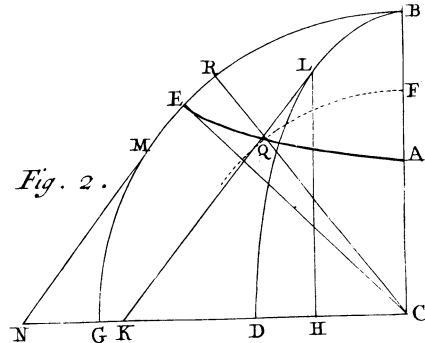
Fig XI



*Fig. 1.*



*Fig. 2.*



**I. Inventio Curvæ quam Corpus descendens brevissimo tempore describeret ; urgente Vi Centripetâ ad datum punctum tendente, quæ crescat vel decrescat juxta quamvis Potentiam distantiae à Centro ; dato nempe imo Curvæ puncto & altitudine in principio Casus. Per Joh. Machin, Astron. Profess. Gresh. & Reg. Soc. Secret.**

**S**it centrum Virium  $C$ , (*Fig. 1. 2*), quo centro ad distantiam  $CB$  æqualem altitudini unde Corpus casurum est, describatur Circulus  $BEG$ , & fiat angulus  $BCG$  rectus. Ponatur  $A$  punctum Curvæ infimum, ubi axi  $CB$  occurrit ad datam distantiam  $CA$ . Oportet invenire punctum  $Q$ , ubi Curva celerrimi descensus  $EQA$  occurrit circulo  $QF$ , ad datam aliam distantiam  $CF$ . Problema hoc duos habet Casus, quorum alter pendet ab Hyperbola & Circulo, alter ab Ellipsi & Circulo.

*Cas. 1.* Si fuerit Vis centripeta reciproce ut distantia à Centro. Sit  $KLM$  (*Fig. 1.*) Hyperbola quævis rectangula centro  $C$  & Asymptoto  $CB$  descripta, quæ occurrat normalibus  $BK$ ,  $AM$  super ipsam  $BC$  ad puncta  $B$ ,  $A$  erectis, in  $K$  &  $M$ ; ordinatæ vero cuilibet intermediæ  $FL$  ad punctum  $F$  erectæ, in  $L$ . Fiat  $CD$  ad  $CG$  ut  $\sphericalangle AFLM$  ad  $\sphericalangle ABKM$ , & sit  $DH$  normalis super  $CG$ : dein capiatur Sector  $RCB$  ad Arcam  $HDCB$  ut data Area Hyperbolica  $ABKM$  ad datum Rectangulum  $CA \times AM$ . Tum recta  $RC$  occurret circulo  $FQ$  in puncto  $Q$ , quod quidem est ad Curvam celerrimi descensus  $EQA$ .

Hab-

Habebitur autem punctum E, à quo inciperet Corporis casus, capiendò Sēctorem B C E ad Arcam Quadrantis B C G, in eadem ratione Areæ Hyperbolicæ A B K M ad rectangulum sub C A & A M contentum.

*Coroll.* Hinc si recta R C, circa centrum C revoluta, faciat Sēctores R C B proportionales Areis H D C B, in quibus quadrata Bafium C D sumuntur in progressionē Arithmeticā: tum rectæ C R interfecabunt Curvam E Q A ad distantias à centro C Q, quæ decreſcant in progressionē Geometricā

*Caf. 2.* Si vero Vis centripeta fuerit reciproce ut alia quævis Potestas distantiae à centro; sit  $n + 1$  Index istius Potestatis (ubi  $n$  potest esse Numerus quilibet integer vel fractus, affirmativus vel negativus) sitque  $H = C B$  altitudo maxima Curvæ quæsitæ E Q A,  $b = C A$  altitudo minima ejusdem, &  $A = C F$  altitudo alia quævis intermedia. *Fig. 2.*

In recta C G capiatur C D ad C B ut  $\sqrt{b^n}$  ad  $\sqrt{H^n}$ , atque etiam C H ad C D ut  $\sqrt{A^n - b^n}$  ad  $\sqrt{H^n - b^n}$ . Centro C, semiaxibus C D, C B, describatur Ellipsis B L D, cui occurrat ordinatim applicata H L in puncto L; & ducatur recta L K, quæ Ellipsin tangat in L, & Axi minori C D producto conveniat in K: dein Tangenti K L parallela ducatur N M, circulum B E M G tangens in M & ipsi C D occurrens in N. Denique capiatur Sēctor R C B, qui sit ad Arcam N M B L K N, inter Circulum & Ellipsin & utriusque Tangentes rectamque N K comprehensam, in ratione Numeri binarii ad Numerum  $n$ . Tum recta R C interfecabit Circulum F Q in puncto Q, quod erit ad Curvam celerrimi Descensus E Q A.

Quod si fiat Sēctor B C E ad arcam B D G, inter Ellipseos & Circuli Quadrantes interceptam, in ratione dictâ Binarii ad Numerum  $n$ , coeuntibus scilicet punctis L, D & M, G; (ob  $A^n = H^n$ ) erit punctum E unde in-

choaz-

choaretur Casus Corporis brevissimo tempore descendentis ad A, descensuque suo Curvam E Q A describentis, quam tangit recta CE in E, quamque ad angulos rectos secat CB in A.

Harum Constructionum Demonstrationes è Celeberrimi D. *Newtoni Quadraturis*, ejusdemque *Philos. Nat. Principiis* (Prop. XXXIX. & sequentibus aliquibus) petita, aliâ datâ occasione ostendentur. Problema autem est alterius generis, Describere Curvas per quas Corpora, de puncto summo E, seu principio casus, demissa, celerissimo descensu ad inferiora data puncta Q, urgente qualibet Vi centripeta, ferrentur; cujus quidem solutio in potestate est. In præsentia sufficiat generalem hujusmodi Curvarum tradidisse Ideam, earumque ad Circuli & Hyperbolæ Quadraturas relationes indicasse, absque quibus easdem Geometrice construere haud adeo proclive est.